

Rust Diseases of Wheat

Three rust species are recognized as important pathogens to wheat production in Kansas and worldwide. Almost every year, wheat loss estimates by the Kansas Department of Agriculture and Kansas State University identify one or more of the three rusts in the ranking of the three most important diseases to the crop. Millions of bushels of grain are lost to the rust diseases each year in Kansas despite control practices. The three rusts are black stem rust by *Puccinia graminis*, leaf rust by *P. recondita*, and stripe rust by *P. striiformis*. The three rusts have somewhat similar life cycles, are wind dispersed, have many physiological races, and generally do not over winter here in Kansas. Resistance in wheat cultivars is the primary means of control.

Figure 1. Reddish orange stem rust pustules on leaves and stem, USDA-ARS Cereal Rust Lab.



Black stem rust is a rust fungus that attacks wheat, barley, and rye and infects such native grasses as goatgrass. It completes its life cycle on alternate hosts of barberries, *Berberis vulgaris*, and some species of *Mahonia*. New races of the rust fungus may occur when infection occurs on the alternate hosts. It is for this reason that federal and state plant health regulations address barberry/Mahonia propagation and movement of plants. New races can be devastating to a crop. Some races in Africa pose a significant problem if they would reach through weather patterns or other means, production regions in Mexico and the United States. The rust has not been a problem to Kansas in recent years.

Figure 2. Yellow stripe rust pustules, Univ. of Ark. Extension Service.



Stripe rust or sometimes called yellow rust is favored by cooler temperatures than stem rust or leaf rust. Alternate hosts for the rust fungus are not known. The disease does not overwinter in Kansas. Each spring, the uredinospores come into the state riding southerly wind currents and infect the crop. In recent cool wet springs, the disease has caused over 25% per cent loss in susceptible cultivars. The pustules are yellow and have a linear orientation between veins of leaves giving the name of stripe rust or yellow rust.

Figure 3. Orange leaf rust pustules, Univ. of Ark. Extension Service.



Leaf rust or called orange rust is favored by warmer temperatures than stripe rust. It is the most important disease to Kansas wheat on an annual basis. It occasionally will overwinter in the state but primarily blows in from southern production areas. Losses can be substantial from this disease much like the other two rusts.